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Leveraging and Deleveraging: Pluses and Minuses

Livia Ilie[a], Roxana Olaru[b]*

[a]*Faculty of Economic Studies,"Lucian Blaga" University, Sibiu, Romania*
[b]*Bucharest University of Economic Studies, Bucharest, Romania*

Abstract

As in physics, leverage is an amplifier. In business, the leverage is amplifying the losses or the gains. In good times, leverage is good, it is busting the gains, it supports economic growth. Companies and governments are using leverage at large scale. In bad times, it is busting the losses. Companies and governments will have to deleverage. This paper aims to present in brief the concepts of leveraging and deleveraging, to explain why companies, banks and governments are using the leverage, and what are the consequences of using it? The high degree of leverage is one cause of a financial crisis and therefore deleveraging is usually following a financial crisis. We will address the issues of leverage and deleverage both on micro and macro level. Deleveraging entails not only risks, but also opportunities, notably the chance to strengthen financial stability. The opportunities at both macro and micro levels are more likely to materialize if the deleveraging process unfolds in an orderly manner and not in the context of increased stress and risk aversion.

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Keywords: financial crisis, levaraging, delevaraging

1. Introduction: why and when is leverage useful

The modern economy is built on debt. Debt can help companies to expand, to create jobs, it helps economic growth. But when debt is used not wisely it can create big problems.

When the market is on a bull trend, using debt to increase the assets is beneficial. The higher leverage is determining a higher return on capital. In this context, financial institution used huge leverage: Merrill Lynch a 33 times leverage

* Corresponding authors:
Ilie Livia, e-mail address: livia.ilie@ulbsibiu.ro
Olaru Roxana, e-mail address: olaru.roxana@gmail.com

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(used $30 millions in equity to raise $1 trillion in debt), Goldman Sachs a 25 times leverage, Bear Sterns a 42 times leverage.

Many well known economists or decision makers like Paul Krugman, Ben Bernanke argued in recent years that not the level of debt but its distribution matters. So the aggregate level of debt is not a cause of the current global financial crisis, but the distribution of debt can be considered a causal factor (Krugman, 2011; Bernanke, 2000). But empirical evidence proved over time that debt has important macroeconomic consequences, as it increases demand which is the base for investment and speculation (Minsky, 1982).

2. Theories and concepts

The value of the cash flows produced by firm's assets (the left-hand side of the balance sheet) can be assimilated with "the size of the pie" and the right-hand side of the balance sheet is the "slicing of the pie". The company can divide its cash flows in as many parts it wants, but the sum of the parts will be always equal with the value of the cash flows: the value of the pie does not depend on how it is sliced.

Franco Modigliani and Merton Miller (MM) have received a Nobel Prize for applying this basic idea to corporate finance. In 1958, MM has shown that **the value of the firm does not depend on the capital structure when there are no taxes and well-functioning markets exist** (well-functioning capital markets means that capital markets are efficient; someone can transact securities without restrictions and can borrow and lend money in same condition as companies) (Modigliani and Miller, 1958). So, financial managers can not increase the value of the company by changing the financial mix. In this condition the value of the firm is based only on the assets' profitability and the NPV of investment projects.

Modigliani and Miller sustain that the firm can not do more for the investor than the investor can do itself. The investor can borrow money personally. There is no difference between borrowing personally and investing in an unlevered firm or investing directly in a levered firm and in consequence the value of the firm remains unchanged.

Proposition I of MM (debt irrelevance proposition) states that under ideal conditions the debt financing decision should not matter for shareholders. When the firm is financed only with equity all cash flows from operations belong to shareholders. When the firm is financed 50% by debt and 50% by equity the cash flows from operations are split between creditors and shareholders but not 50:50 proportion. Shareholders receive more. Shareholders assume more risk and are entitled to receive higher returns. Debt financing is not affecting the operating risk, only the **financial risk**. Having only half capital it is absorbing same operating risk, so the risk per share doubles. The financial leverage is increasing the expected return to shareholders but in increasing in the same time the risk. The two effects cancel so that the value of the firm remains unchanged.

Proposition II of MM states that the return on equity of a levered firm is increasing in a direct proportion with the debt/equity ratio in order to cover the financial risk.

$$r_E = r_{assets} + \frac{D}{E}(r_{assets} - r_D) \tag{1}$$

In conclusion, MM propositions suggest that debt policy should not matter.

Why financial managers do matter about the financing decision? In real world there are imperfections. The tax system brings an advantage for the debt financing. Debt financing has an important advantage: interest is tax-deducible.

According to Proposition I of MM the value of the pie does not depend on how it is sliced between creditors and shareholders, but we have to take into account a third slide: for the government. The value before the tax is not changed by slicing. Anything a company can do to reduce the slice of the government, will provide more to others. One possibility: borrow money (this is reducing taxes and is increasing the cash flow to shareholders).

Introducing taxes we can observe the change in both the value of the firm (the levered firm has a higher value than the unlevered firm) and the cost of capital (a decrease of the cost of capital):

In a world with taxes the company should borrow to maximize the value and minimize the cost of capital.

Value of levered firm = Value of unlevered firm + Present value of the tax shield (2)

The more levered the firm is the higher the probability of bankruptcy.

The trade-off theory sustains that the debt financing decision is a trade-off between the tax advantage due to the interest and the cost of bankruptcy.

Market value of the levered firm = Value of the unlevered firm + Present value of the tax shield - Present value of the cost of bankruptcy (The cost of bankruptcy = probability of bankruptcy x losses in the value of assets due to liquidation)

There is an optimum level of debt for which the present value of tax shields due to additional debt is just off-set by the present value of the cost of financial distress, and the value of the firm is at the maximum. This optimum level, target D/E ratio, varies from firm to firm: companies with more secure, tangible assets may have a higher debt ratio as compared to less profitable companies with risky, intangible assets.

There are also theories that take into account the information asymmetry. There is an order in the preferences of companies in what concerns the financing alternatives:

1. Firms prefer internal funds (using internally generated funds the firm is not giving adverse signals).
2. Firms use first debt and only as a last resort equity.

This theory explains why profitable firms borrow less (they need less externally generated funds). Managers prefer internally generated funds as compared to externally generated funds.

Risk is a measure of variability. In the income statement there are two fixed elements that can amplify the variability of profits. Fixed costs from operations will amplify the variations of sales in EBIT. Interests (financial fixed costs) will amplify the variations of EBIT in profit.

The operating risk is measured by the **Degree of Operating Leverage** (DOL); it is showing the variability of EBIT due to the variability in Sales:

$$DOL = \frac{\%\Delta EBIT}{\%\Delta Sales} = \frac{S - CV}{S - CV - CF} = \frac{EBIT + CF}{EBIT} \tag{3}$$

The smallest operating risk is when fixed cost from operations is zero. DOL is 1, meaning that a 1% change in Sales brings a 1% change in EBIT. If there are fixed costs, the higher they are the higher the DOL is meaning that the variations in Sales are amplified and reflected in EBIT, so the operating risk is higher.

The financial risk is measured by the **Degree of Financial Leverage** (DFL); it is showing the variability of Profit due to the variability of EBIT:

$$DFL = \frac{\%\Delta \pi}{\%\Delta EBIT} = \frac{EBIT}{EBIT - I} \tag{4}$$

The smallest financial risk is when interest is zero. DFL is 1, meaning that a 1% change in EBIT brings a 1% change in Profit. If there are interests (so there is debt), the higher they are the higher the DFL is meaning that the variability of EBIT will be amplified and reflected in Profit, so the financial risk is higher.

Total risk is measured by the **Degree of Total Leverage** (DTL); it is showing the variability in Profit due to the variability in Sales:

$$DTL = \frac{\%\Delta \pi}{\%\Delta Sales} = \frac{S - CV}{S - CV - CF - I} = \frac{EBIT + CF}{EBIT - I} \tag{5}$$

$$DLT = DOLxDFL \tag{6}$$

The smallest total risk is when all fixed costs are zero. DTL is 1, meaning that a change by 1% in Sales brings a change of 1% in Profit. If there are fixed costs, the higher they are the higher the DTL is meaning that the variability in Sales will be amplified and reflected in Profit, so the total risk is higher.

Besides the quantitative analysis made in order to evaluate the effect of each financing alternative on the profitability and the risk of the firm financial managers should make also some qualitative analysis. Firms manage very carefully their capital structures. The choice of an optimal capital structure should balance the fiscal advantage with the agency costs, with the cost of bankruptcy, with the cost of reducing financial flexibility. In the same time managers have to consider transaction costs and the signaling effect of their decisions. Unfortunately these costs can not be measured precisely.

Studies have shown systematic differences in the capital structure between industries due to: different degree of operating risk, different quality of the assets, different attitudes of management towards risk. Taking all these issues into account, it is very difficult to determine exactly an optimal capital structure.

3. The Romanian case

We study 23 Romanian companies listed on Bucharest Stock Exchange. We collected their annual financial situations from several sources (their official websites, ktd.ro, brb.ro <the official website of the BSE> and cnvmr.ro <the official website of the National Securities Commission>) and grouped them in 5 industrial sectors: the manufacture of car parts, equipment, ships and aircraft (5), manufacture of fertilizers and chemicals (4), production of ferrous metals, aluminum, plastic and abrasive products (6), electrical wiring (3) and others <pharmaceutical, real estate, food industry> (5).

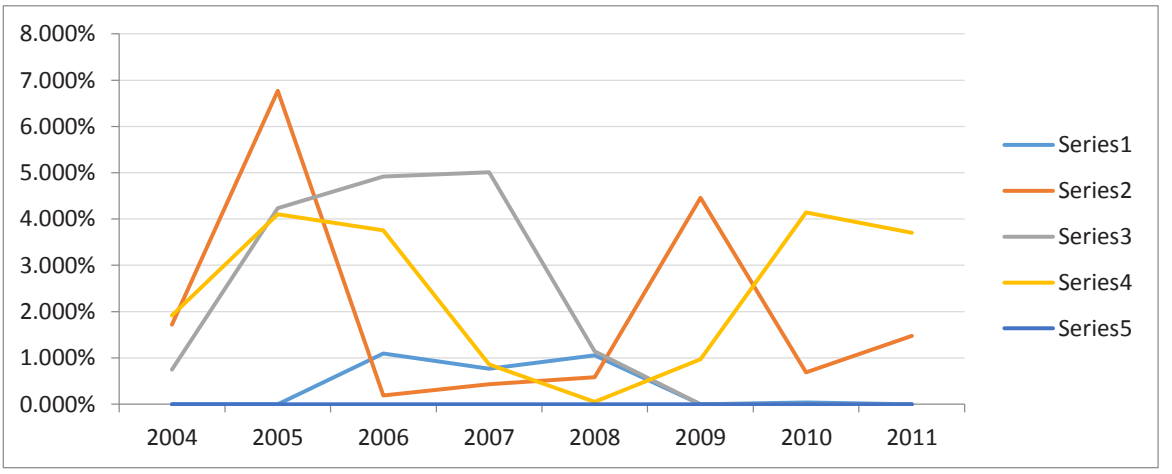
We perform our analysis using an 8-year period, from 2004 to 2011, looking at several important variables that we computed using factors from the annual financial situations or the companies: Indebtedness Rate to the Total Assets, Operational Leverage, Financial Leverage and Total Leverage.

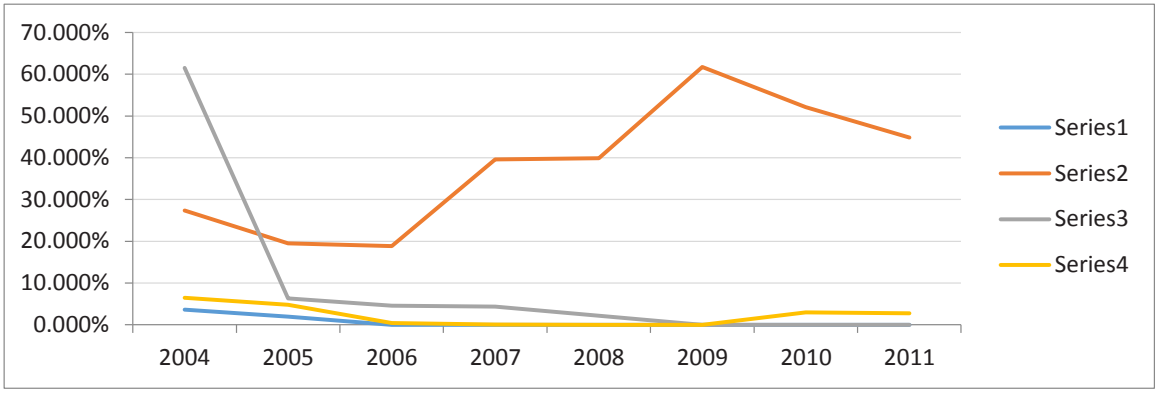
In order to better see and understand the similarities among companies' evolutions over the studied period, we analyzed each group separately.

As opposed to any expectation to see significant leverages over the bull period and a visible trend of deleveraging since the current financial crisis started, one can not identify a coherent financing policy for the companies that were analyzed. A major issue we suspect to be the reporting of data that is less accurate and follows different interests each year.

Due to this issues we plan to continue the research in identifying the real causes of the situation and to make also a comparison to similar companies acting in Europe.

Indebtedness Rate to the Total Assets, 2004-2011

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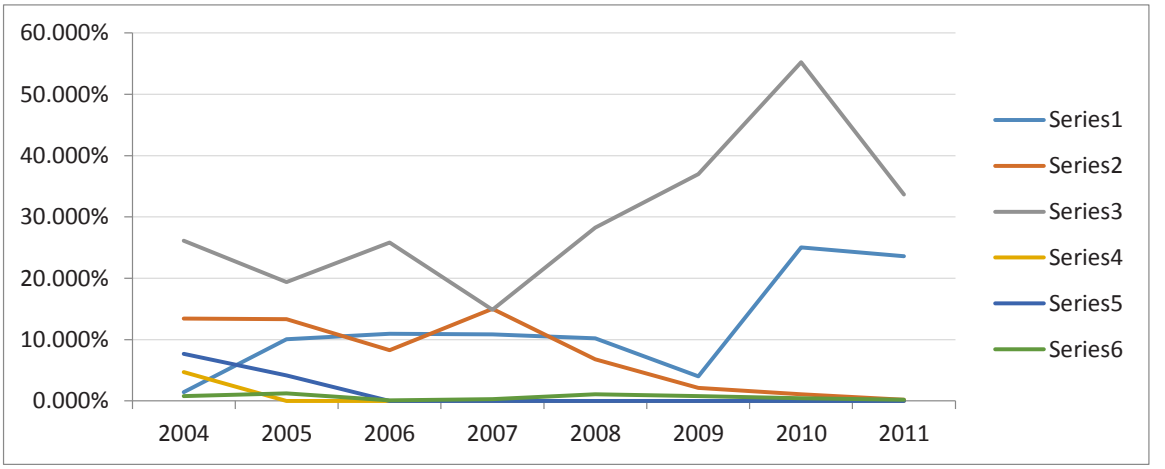
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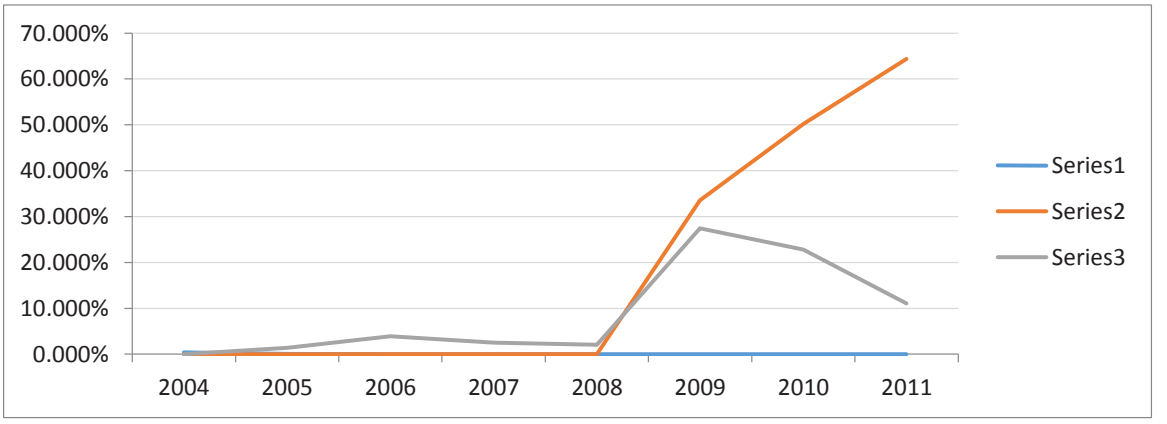
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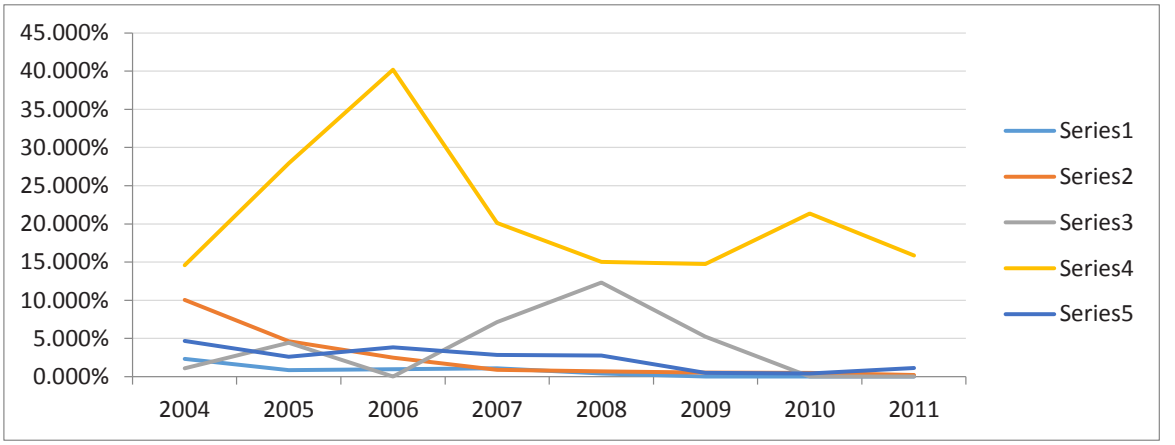
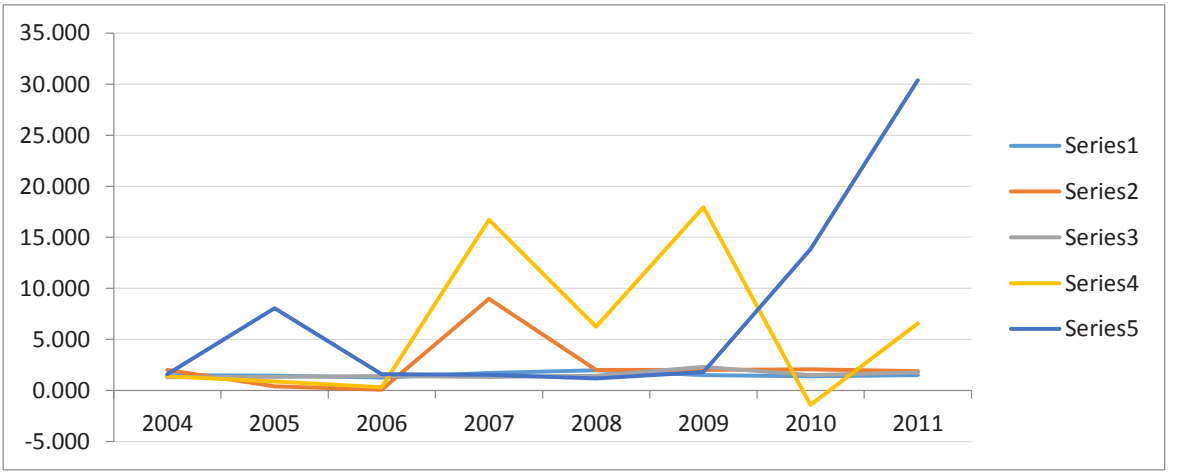
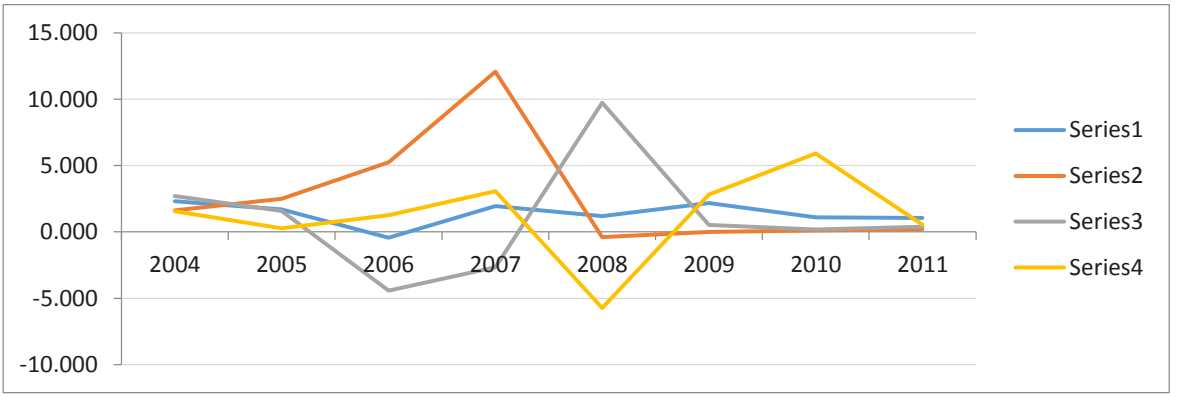
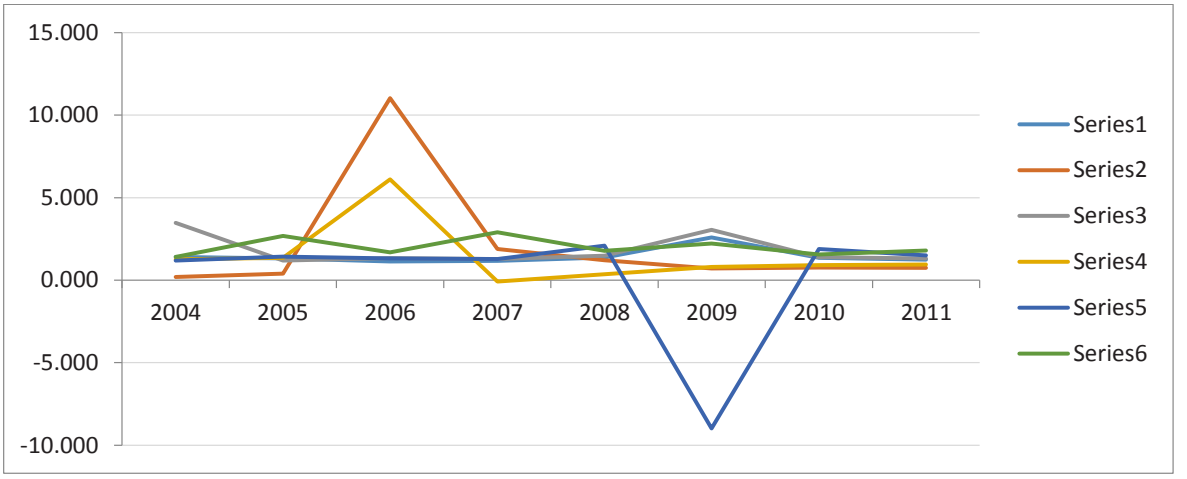


Operational Leverage, 2004-2011



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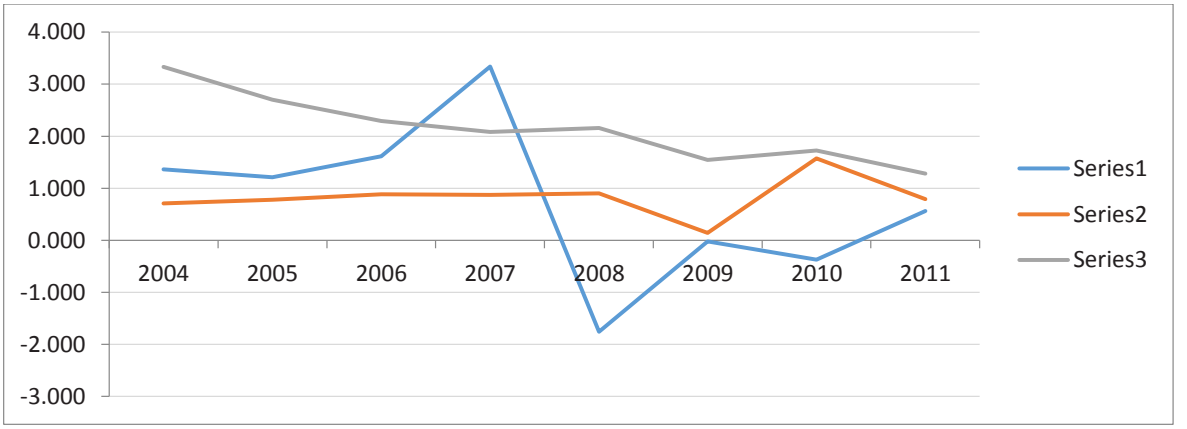
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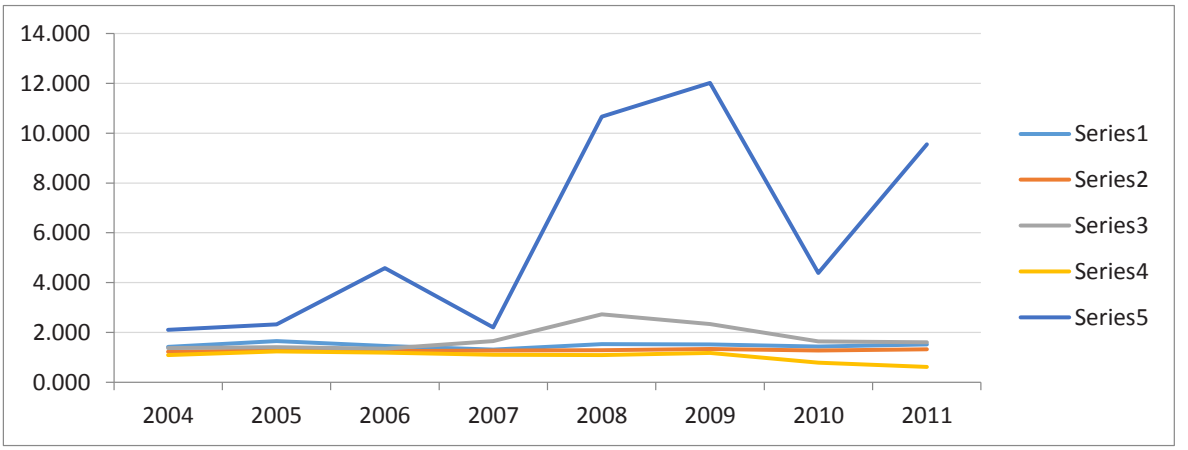
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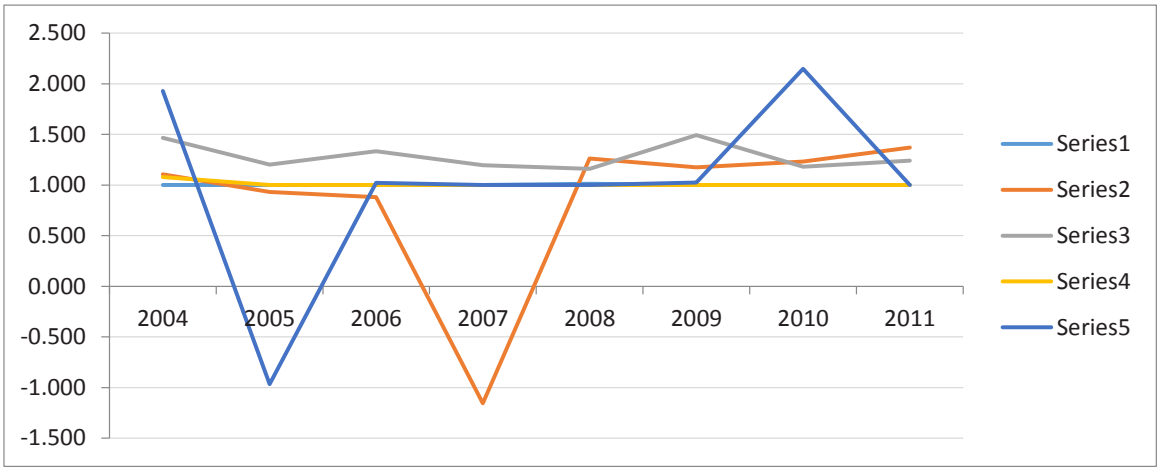
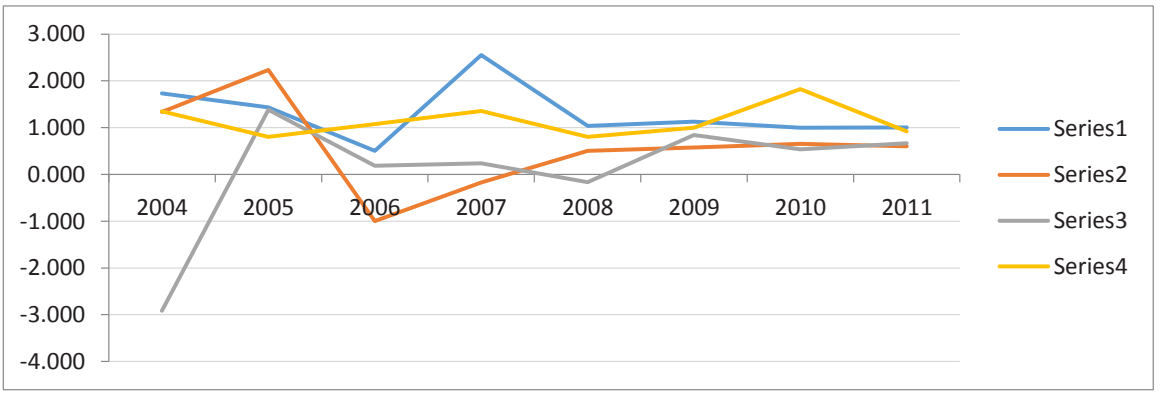
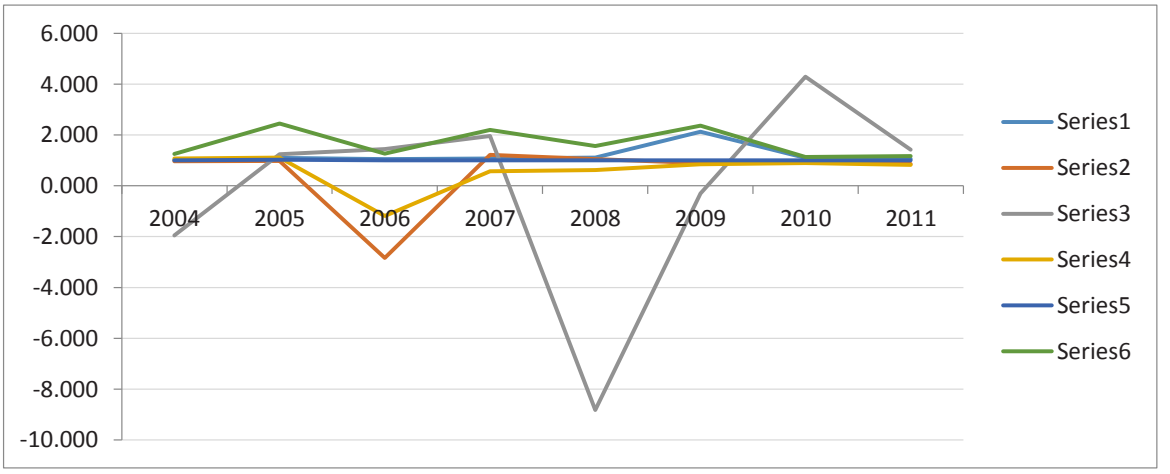
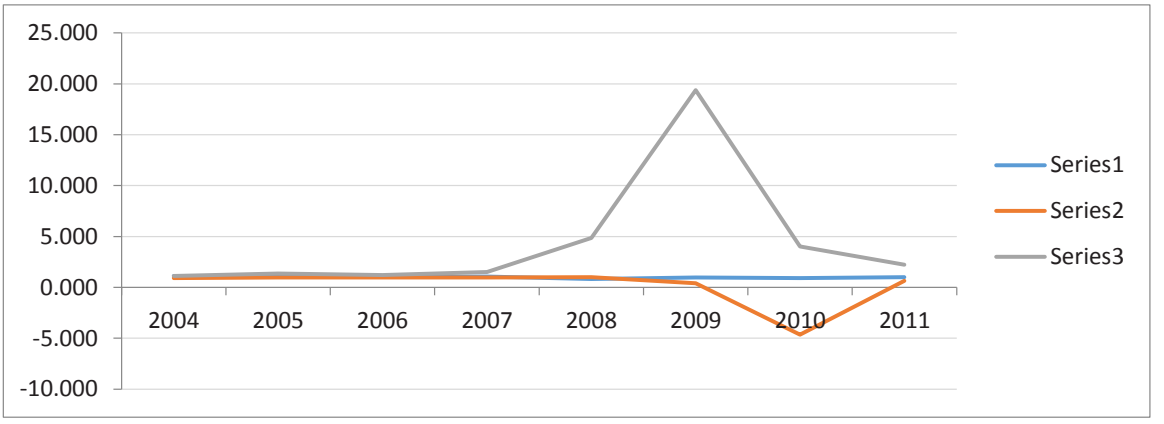
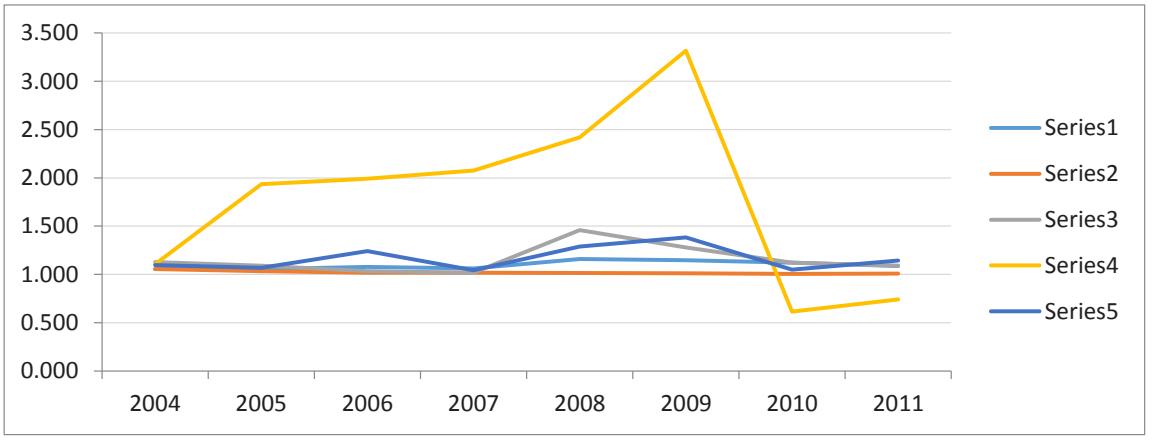
Financial Leverage, 2004-2011



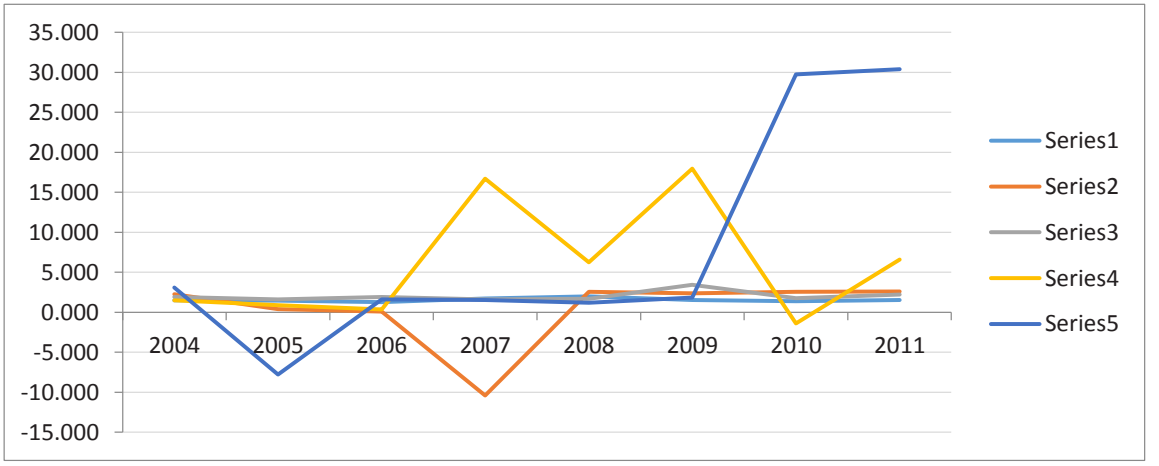


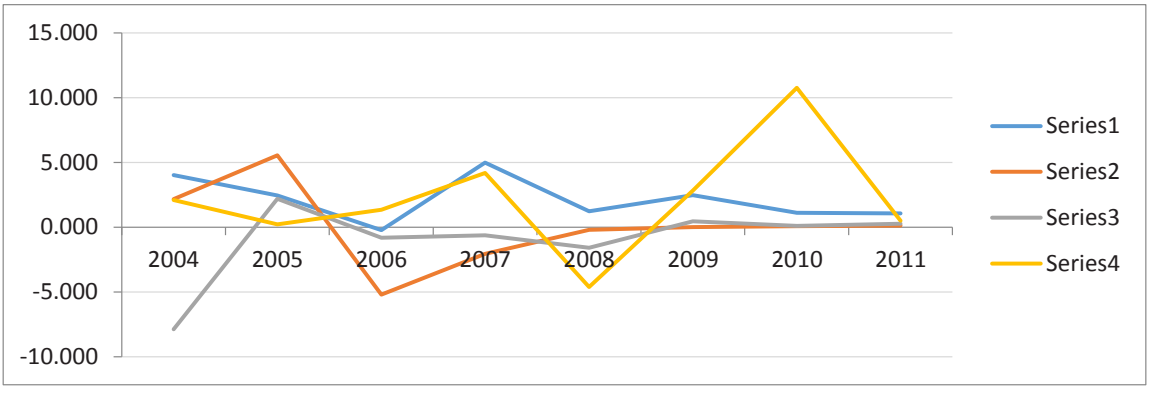






Total Leverage, 2004-2011

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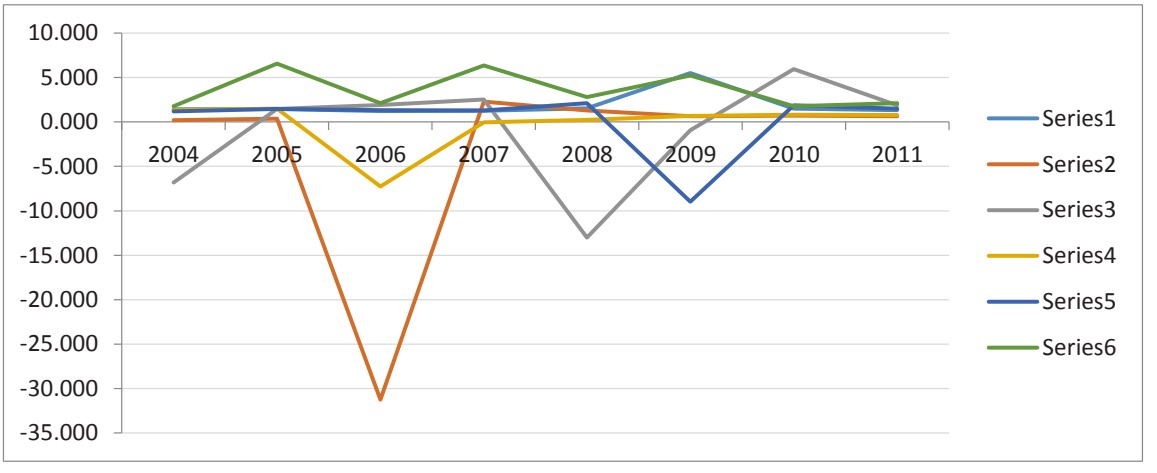
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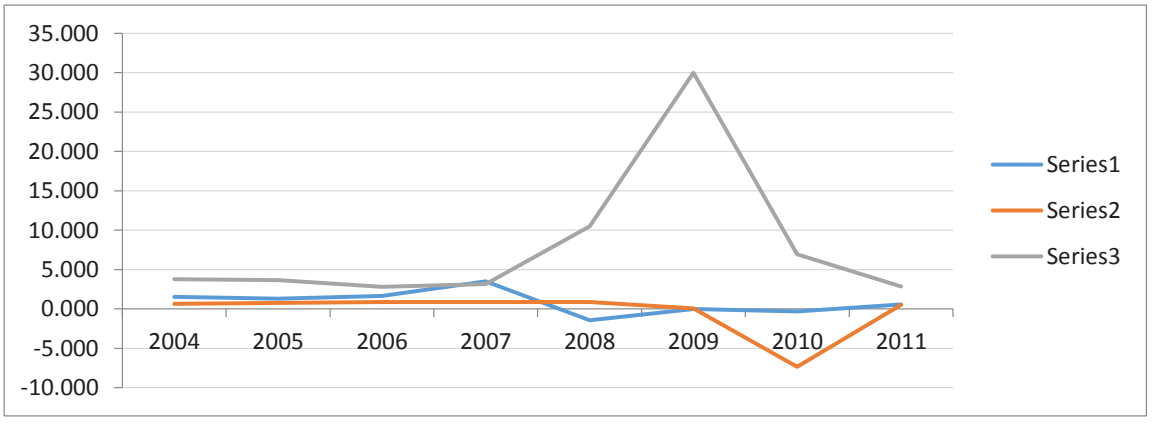
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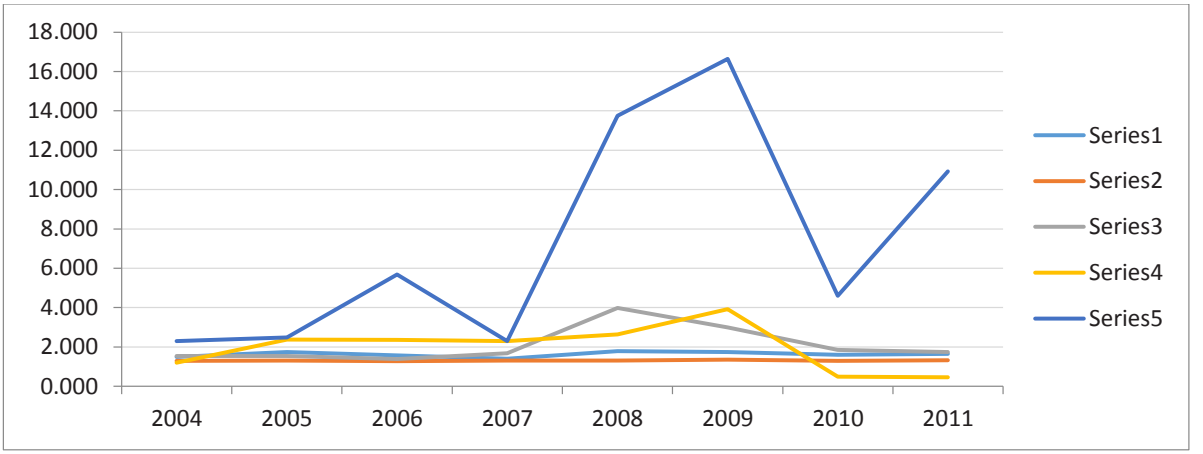

4. Conclusions

The period after the Great Depression can be divided in two sub-periods:

- since the '40s to 2008 we have a period where the debt to GDP ratio increased, so we can call it a Leverage Period
- after 2008, where we can identify the starting of a sharp decrease the debt to GDP ratio, a Deleverage Period; so the global financial crisis marked a turning point in the leverage process.

Over the history what we can observe is that deleveraging is a long and painful process.

Developed economies and companies increased leverage over the last decades. The trend will now reverse. How chaotic and lengthy will be the deleveraging process depends on how the process is managed.

Debt can be used by households, companies, governments. Over the decades the increase in debt had different emphasis in different countries. While in Japan and Italy government debt is more significant, in US an UK household debt is leading the way. But using more household and government leverage, the debt is less sustainable as compared to company leverage which can improve production capacity and efficiency.

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